

The Society for Conservation GIS e-Newsletter Volume 4, Issue 1 July 2004



*Al Uzza -
Nabataean
Goddess,
Temple of the
Winged-Lion.
Petra, Jordan*

GIS for Cultural Heritage Management in Petra, Jordan

Cultural Resource Managers are increasingly realizing the merit of digital data management for better conservation and analysis opportunities in their various archaeological and cultural resource management efforts. A recent World Bank grant for The Hashemite University in Zarqa, Jordan resulted in the development of Archaeology GIS curriculum for managing cultural heritage sites in Jordan.

Archaeology GIS Curriculum and Training materials

GIS Training curriculum was developed for the University in cooperation with the ESRI International Distributor in the region, who supported the effort with imagery. The main task was to develop a GIS training curriculum for archaeology, for Archaeology Students at the Hashemite University and Petra Archaeology Park Managers. It was also a key opportunity to build some consensus between different representative groups within the Bedouin community in and around the Petra and Wadi Musa region.

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The Society for Conservation GIS (SCGIS) is a non-profit organization that builds community, provides knowledge, and supports individuals using Geographic Information Systems (GIS) and science for the conservation of natural resources and cultural heritage.

For more information or to become a member, visit the Web site at www.scgis.org.

Digital Data Capture and Data Management

The curriculum and training materials were developed in a Jordanian context for Petra, including remote sensing data, GPS points, CAD data and GIS layers.

The highest available resolution imagery is required for 3D rendering of the image over

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terrain models, due to the distortion that occurs within a 3D context. Another major component was developing ISO metadata standards using the ESRI ArcCatalog ISO Wizard for helping to ensure data integrity, including documenting the accuracy and method of capture of the data. This also facilitated the sharing of data across the many agencies and organizations that supported the effort, including the Petra Preservation Project located at the Hashemite University, the Royal Jordanian Geographic Center and the ESRI Distributor, among others.

The park faces a significant challenge in deciding how to manage cultural heritage resources where overlapping archaeological periods date back to the stone age. The archaeological periods include the Paleolithic and Neolithic eras, the Nabataean period starting in 300 BC, later Byzantine Roman periods from the 1st century A.D. to the 6th century A.D., and even castles constructed during the Crusades. Most of the tombs are from the Nabataean Culture. The geological record shows two major earthquakes, over a span of approximately 200 years, facilitated the Nabataean culture's decline. The Romans then built the colonnaded street of Petra, leaving their mark in and around the older temples and tombs.

Park Management Application for Park Guides

One aspect of the effort led to an initial GIS park management application for park managers and staff. The goal was to give Park staff Introduction to ArcGIS training, with emphasis on park facility management, including design of management zones, facilities, and archaeological protection and restoration. Topics included:

- Identifying appropriate Tour routes for various transportation methods including horse, camel, and burro. All have certain places they're allowed to go and not go due to terrain and sensitivity of the site.
- The park grounds are extensive, and improved bathroom facilities are needed. There are thousands of

Message from the Editor

The 7th Annual SCGIS conference will be September 27-29, at the US Fish and Wildlife Service's National Conservation Training Center, northwest of Washington DC. For more information, see Susan Miller's notice in this newsletter. Also see Frank Biasi's article on the global role of SCGIS. This topic will be one of the points of discussion at the SCGIS conference.

This newsletter features an article by Lisa Pierce on using GIS to help manage cultural resources in Jordan. It's a fascinating look at one of the many ways GIS can be used to help promote the sustainable use of resources. Also included is a description of conservation efforts underway at Patrick Air Force Base and Cape Canaveral, Florida.

As a member of SCGIS I look forward to finding out more about how GIS is being used to better manage our natural and cultural resources. The Conservation community is doing important work all around the world. I invite all members of SCGIS to send in your ideas, news and notes, and descriptions of your work now for the next newsletter.

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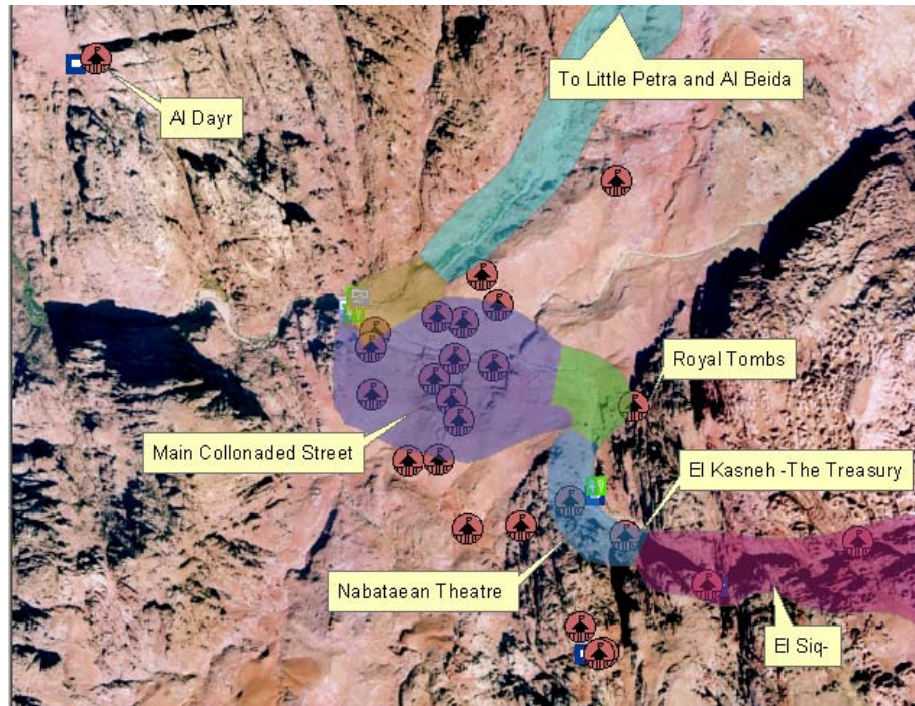
tombs carved into the walls, including many famous ones with intricate facades. With a relative lack of trash and bathroom facilities, misuse of the tombs for these purposes is being mitigated through improvements in added facilities for tourism.

Graffiti Management - Facilities management application for graffiti cleanup. One conservation component incorporated into the class materials included graffiti management in the park.

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*Petra Archaeology
Park Locales-
L.Pierce- 2003*

This task involved identifying categories of graffiti for appropriate removal. The park has graffiti that must be preserved – including some which dates back to 300 BC and the Roman period. Older graffiti tends to be carved into the stone, and modern graffiti is generally sprayed on. At what point is graffiti not



graffiti? By the 1940's and 1950's graffiti becomes less historically valuable and thus needs to be removed. Because of the park's rock surface, identifying appropriate treatment for certain surfaces depends on the nature of the graffiti and rock types. In some cases, older graffiti is carved into older carvings and historically valuable features. There are different treatments for different types of graffiti dating from different periods. The management zones were identified and a system developed to prescribe appropriate treatment for different types of graffiti removal.

The proposed method is to assign clean-up crews to different zones, for example sending the rock crew to zone 5, and spray paint crew to zone 2 to ensure that appropriate skilled methods are applied to the right surfaces.

3D Modeling of Temples and Building Features

Park and University staff wanted to better understand how to build their CAD data more effectively so they could then create 3D models of building features, quickly. Ms. Pierce gathered height information for 3D modeling on-site, as well as from Dr. Phillip Hammond's extensive research of the Winged Lion Temple. This material was available at the American Center for Oriental Research (ACOR) in Amman. Ms. Pierce used specific height values for a section of the Temple of the Winged Lion' columns and walls to demonstrate the value of collecting both horizontal and vertical values for each feature when GPS data is collected.

Thus, the famous Temple of the Winged Lion was used as a prototype example for a precision 3d fly-through of Petra, which was presented to the Minister of Culture during the **International Conference On Science and Technology in Archaeology and Conservation**, held in December of 2003 at the Dead Sea.

Lisa A. Pierce and Miguel Garriga

Ms. Pierce is a member of SCGIS Board and works at the California State University San Bernardino, Water Resources Institute, developing the WRI's digital geospatial archival system using ESRI's ArcIMS Metadata Service. l.pierce@verizon.net.



3D Model of Petra- L.Pierce 2003



Conservation GIS Activities at Patrick Air Force Base, Florida

We have been concentrating on mapping the extent of invasive exotic vegetation, primarily cogon grass and Brazilian pepper. Using the GPS we can define the area overrun with invasive flora and, after transferring that information to a GIS layer, calculate the acreage. This information is, in turn, used to estimate the cost of a project to eliminate the invasive and begin the project funding process.

We've started recording sea turtle nests by GPS/GIS. It is clear to us that points gathered by GPS are a great improvement over the previous method of estimating nest locations by kilometer markers. Other recent activities include mapping the locations of gopher tortoise burrows and indicating in the metadata whether the burrows were occupied. We have also mapped locations of osprey nest platforms and bat houses.

Dale Hawkins

Dale Hawkins is a Natural/Cultural Resource Manager at Patrick Air Force Base's 45th Space Wing, Environmental Flight. His responsibilities include the Cape Canaveral, Patrick AFB, and the downrange stations at Antigua Air Station and Ascension Auxiliary Airfield.

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The Global Role of the Society for Conservation GIS

Science-based conservation and adaptive ecosystem management rely heavily on accurate and timely data and information to make sound conservation decisions. GIS, GPS, and Remote Sensing are the primary tools that conservationists and ecosystem managers use to identify and prioritize conservation areas, assess threats to biodiversity, design and implement conservation strategies at multiple scales, and monitor and report changes across space and time. The hard work of collecting, analyzing, and sharing conservation information is performed by thousands of GIS practitioners scattered around the world within government agencies, non-governmental organizations (NGOs), academic institutions, indigenous groups, and private companies.

This scattered group of individuals is working independently, with a wide range of capacity in terms of technology, training, and support. In contrast, corporations that contribute to the loss of biodiversity are information and technology rich as a consequence of having to compete with each other or to outsmart the public sector. Standard economic theory tells us that the asymmetry of information advantages the party that has more and better organized information. When planning conservation strategies and actions, conservationists are often at a disadvantage due to a lack of information and technology. For example, in Kimbe Bay, Papua New Guinea the oil palm plantations have the best aerial images of the forest cover and soils and can consequently choose which land to develop. Conservationists cannot assist the local communities to plan these oil palm plantation expansions because they lack the data, knowledge, and tools to produce the information necessary for that decision making. As a result, the plantation owners always have first and last choice in land use decisions regardless of their impact on ecosystems or local communities.

The Society for Conservation GIS (SCGIS) works to level the playing field and provide balanced information for land use decisions by building the capacity of local communities and conservation organizations to generate and use geographic information to influence the way land and water are used. SCGIS uses three interlocking approaches to achieve this goal - human networking, technology transfer, and regional support nodes.

Human networking involves establishing a global community of practice and peer support network for conservation GIS practitioners. This is achieved through the SCGIS website and discussion groups that connect practitioners worldwide, allowing them to openly share their experience, tools, and techniques. The SCGIS Annual Conference and regional chapter meetings allow this networking to happen on a more personal basis. The knowledge that is exchanged and the collaborations that are initiated through these venues have resulted in tremendous cost savings and more effective conservation projects. This networking has been useful at local, regional, national, and global levels, from the scale of watershed associations to that of large agencies and international organizations.

Technology transfer involves providing appropriate tools and training to practitioners in developing countries and small nonprofits. This is achieved through grants of hardware, software, and training by corporations like ESRI, Hewlett-Packard, and Trimble and big NGO's like The Nature Conservancy, World Wildlife Fund, and Conservation International. SCGIS works to coordinate these grants to identify those most in need, to establish economies of scale in their distribution, and to measure their conservation impact over time. SCGIS also funds scholarships for practitioners to visit developed countries to receive training and perform internships, as well as mentorships for GIS experts to travel to developing countries to provide on-site training and project support and to set up GIS labs.

Regional support nodes evolve through the establishment of Local SCGIS Chapters that bring together practitioners who live near each other to collaborate on local GIS efforts and provide

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mutual support. Regional nodes can further evolve into nonprofit Regional GIS Service Centers that have the capacity to support a network of conservation organizations across a particular region. Regional GIS Service Centers serve as high-capacity nodes that provide advanced expertise, systems, and data sets to low-capacity organizations such as national parks, indigenous groups, and small nonprofits. These centers have proven to be efficient and cost-effective structures for building and supporting GIS capacity and for developing and managing key shared data sets.

Using these three approaches, SCGIS can fill a critical role in helping communities, organizations, and nations achieve the conservation and sustainable development goals laid out in several international conventions including the Convention on Biological Diversity¹, the Commission on Sustainable Development² and the Millennium Development Goals³. All of these multinational agreements outline the increasing need for biodiversity information to support effective decision making, and the importance of capacity-building and sharing of technical knowledge in achieving those goals sustainably and equitably.

SCGIS is uniquely positioned to support these efforts at local, regional, and global scales. No other organization exists to coordinate and leverage a community of GIS practitioners made up of individuals in grassroots organizations, local and national governments, big NGO's, indigenous groups, academic institutions, and private corporations. Even with an all-volunteer leadership and staff, SCGIS has demonstrated the needs and strength of this community through its successful conferences, scholarships, training programs, publications, and regional chapters. After seven years of incubation, SCGIS is working to establish the dedicated core capacity needed to bring its programs and community to levels at which they can influence conservation and development at global scales.

It is up to all of us to help build the capacity and strength of this organization to act locally and support global conservation. There are many ways to contribute to this effort, including recruiting new members, identifying and cultivating donors, volunteering at SCGIS events or on committees, creating or participating in a local chapter, and contributing to this newsletter and the listserv. If everyone gives a bit of themselves to this community, and helps to bring other practitioners into it, SCGIS can help to achieve lasting conservation results as well as support the professional and personal development of its members.

For more information on how you can contribute, visit www.scgis.org.

References:

¹ Convention on Biological Diversity - www.biodiv.org/default.aspx

² Commission on Sustainable Development - www.un.org/esa/sustdev/csd/about_csd.htm

³ Millennium Development Goals - www.developmentgoals.org/

Frank Biasi, SCGIS Co-President, fbiasi@tnc.org



Member News and Notes

Yolanda Wiersma, former newsletter editor, and her husband John Sandlos are pleased to announce the arrival of their son, William Henry David, born on March 10, 2004. They are looking forward to introducing him to all the natural and cultural wonders of the world.



Join us at the 2004 SCGIS Conference

The Society for Conservation GIS (SCGIS) would like to invite you to join us at the 7th Annual SCGIS Conference, September 27-29, 2003, to discuss and promote local and global conservation of natural and cultural resources through geospatial technologies. We are busy designing a diverse conference agenda that will explore a variety of issues ranging from the technical applications of GIS in conservation to recurring philosophical and ethical issues faced by conservationists throughout the world. We will also address the role of the Society in the development of the global Conservation Community.

New Venue – New Coast

ATTENTION: We are pleased to announce this year's conference will be held in West Virginia at the US Fish and Wildlife Services' [National Conservation Training Center](http://training.fws.gov/) (NCTC). Located approximately 75 miles from Washington, D.C., the NCTC campus provides full-service residential facilities, complemented by professional staff, cutting-edge programs and curricula, and the most advanced technology available. NCTC is a gathering place where conservation professionals from all sectors can learn together in an environment especially designed for them. Rich with history, scenic beauty and serenity, NCTC is the ideal location for the SCGIS Annual Conference. Reservations will need to be made earlier, rather than later this year. So please stay tuned to the website for details. A posting will be sent to this list as soon as the venue is prepared for us to begin the registration process. Many thanks!

Conference Format

The conference format will include the following: concurrent sessions for formal presentations; posters sessions; discussion panels for topics such as environmental ethics, integration of GIS, and conservation science; user group meetings; hands-on training sessions; technical workshops; a field trip; and organized socials.

Field Trips

A variety of field trip are being planned for Wednesday, September 29th. Details have yet to be determined... there will likely be multiple options for this play day and will include:

1. A hike in the Shenandoah National Park
2. National Mall/Smithsonian Museum DC Tour
3. ArcPad Scavenger hunt – this may include a river trip (rafting/kayaking), hiking, & biking.

Details regarding all these possible trips will be sent to you as they become available. Please stay tuned to the [Conference website](http://www.scgis.org/conference.html) for confirmation of the field trips listed above and for additional information on the conference.

Susan Miller, SCGIS Conference Committee Chair, smiller@tnc.org

